United States Patent [19]

Sauer

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[54] **APPARATUS FOR EFFECTING ANASTOMOSIS OF TUBULAR TISSUE BY LASER WELDING**

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[58] **Field of Search** ..... 128/303.1, 335, 334 R, 128/305.1, 303 R; 219/121 LC, 121 LD, 121 LU, 121 LV; 408/701

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[57] **ABSTRACT**

Two semi-cylindrical jaws, are releasably attachable around the abutting ends of a pair of tubular tissues that are held together by a tubular stent. A shuttle, which revolves in the jaws 360° around the outside of the junction of the tissues, is connected to a tubular conduit, that extends slidably through a handle on one of the jaws to the exterior of the instrument. The conduit contains at least three fiberoptic cords, the inner ends of which are connected to the shuttle for movement therewith, and to register with a mirror which, is also mounted on the shuttle. The outer ends of the cords are connected, respectively, to a light source for illuminating the seam which is to be welded, to a source of laser energy for directing a laser beam onto the seam, and to a lens which is utilized for observing the site where the welding is to take place. A cable, which extends slidably through the conduit, is connected in one embodiment to the mirror to reciprocate it relative to the shuttle for adjustment of the laser beam accurately onto the seam, in a second embodiment to the mirror to pivot it about an axis transverse to the tissue axes, and in a third embodiment to the inner ends of the cords to shift them relative to the mirror.

In use a light beam and a laser beam are directed through two cords onto the mirror in the shuttle, which reflects the beams onto the abutting ends of the tissues that are to be welded. After the cable has been manipulated to adjust the laser beam correctly onto the proposed seam, the entire conduit is shifted relative to the handle and jaw sections to revolve the shuttle a full 360° around the tissues thereby to laser weld their ends together along a circular seam.

17 Claims, 10 Drawing Figures